WHAT IS CLAIMED IS:

1. A method for manufacturing a light emitting device of a light-emitting device (LED), comprising:

(a) forming a buffer layer over an upper side of a substrate, wherein said substrate comprises sapphire, silicon carbide (SiC) and gallium nitride (GaN);

(b) forming an n-GaN based epitaxial layer over said buffer layer;

(c) forming an MQW layer over said n-GaN based epitaxial layer, wherein said MQW active layer comprises a material so that said MQW active layer emits a light with a wavelength comprising 380 nm to 600 nm in response to an applied electric power on said light-emitting structure;

(d) forming a p-type distributed Brag reflector (DBR) over said MQW active layer;

(e) forming a p-GaN based layer over said p-type DBR, etching away a portion of said n-GaN based layer, said MQW active layer, said p-type DBR and said p-GaN based layer whereby said n-GaN based layer has an exposing region and disposing an n-type electrode over said exposing region and a p-type electrode over said remaining p-GaN based layer after said etching; and

(f) coating a metal reflector over a bottom side of said substrate.

2. The method as in Claim 1, wherein a step of (e') is added in said step (e) after said forming and prior to said disposition of said n-type and said p-type electrodes, said step (e') is forming a transparent contact layer (TCL) having an exposing side, wherein said TCL comprises Ni/Au and other

transparent and conductive layers with a suitable thickness and being transmittable with a light having a wavelength ranging from 380 nm to 600 nm.

3. The method as in Claim 2, wherein said p-type DBR comprises AlGaN / GaN.

4. A light-emitting structure for a light emitting diode (LED), comprising a resonant cavity structure, a contact layer, an n-type metal electrode and a p-type metal electrode, wherein:

said resonant cavity structure formed by a metal reflector, a substrate, a buffer layer, an n-GaN based layer, an MQW active layer and a p-type distributed Bragg reflector (DBR), wherein and said substrate comprises sapphire;

said contact layer being a p-GaN based layer and formed over said p-type DBR;

said n-type metal electrode disposed over an exposing layer of said n-GaN layer; and

said p-type metal electrode disposed over said p-GaN layer;

wherein said MQW active layer comprises a material so that said MQW active layer generates a light with a wavelength comprising 380-600 nm in response to an applied electric power between said n-type metal electrode and said p-type metal electrode.

5. The light-emitting structure as in Claim 4, wherein said substrate further comprises silicon carbide (SiC) and gallium nitride (GaN).

6. The light-emitting structure as in Claim 4, wherein said contact layer further comprises a p-InGaN and a p-AlInGaN layers, and said p-type DBR comprises AlGaN / GaN.

7. The light-emitting structure as in Claim 4, wherein said metal reflector has a reflectance of greater than 90% and said p-type DBR has a reflectance of 50-80%.

8. The light-emitting structure as in Claim 4, wherein the light-emitting structure further comprises a transparent contact layer (TCL) and said TCL is formed over said contact layer and transparent to a light having a wavelength of 380 to 600 nm.

9. A light-emitting structure for a light-emitting device (LED), comprising:

a metal reflector on a bottom side of a substrate, wherein said metal reflector has a thickness of 50 Å to 10 μm and is made of a conductive metal or metal alloy;

an LT-GaN / HT-GaN buffer layer having a first formed LT-GaN buffer layer on said substrate and a then formed HT-GaN buffer layer on said LT-GaN buffer layer, wherein said LT-GaN buffer layer has a thickness of 30 to 500 Å while said HT-GaN buffer layer with a thickness of 0.5 to 6 μm;

an n-GaN semiconductor layer having a thickness of 2 to 6 μm;

an InGaN/GaN MQW active layer;

a p-AlGaN/GaN distributed Bragg reflector (DBR); and

a p^+-GaN based semiconductor layer having a thickness of 0.2 to 0.5 μm;

wherein said substrate comprising sapphire and said MQW active layer emits a light with a wavelength comprising 380-600 nm in response to an applied electric power;

10. The light-emitting structure as in Claim 9, wherein said substrate further comprises silicon carbide (SiC) and gallium nitride (GaN), and wherein said metal reflector comprises Ag, Al and other metallic materials.

11. The light-emitting structure as in Claim 9, wherein said p^+-GaN based semiconductor layer further comprises a p-InGaN and a p-AlInGaN layers.

12. The light-emitting structure as in Claim 9, wherein said p^+-GaN based semiconductor layer is further coated with a transparent contact layer (TCL), and said TCL comprises Ni/Au and other conductive material transparent to a light having a wavelength of 380 nm to 600 nm.

13. A method for manufacturing a light-emitting structure of a light-emitting device (LED), comprising:

(a) forming a buffer layer over an upper side of a substrate wherein said substrate comprises sapphire, silicon carbide (SiC), silicon (Si) and gallium nitride (GaN);

(b) forming an n-type DBR on said buffer layer;

(c) forming an n-GaN based layer over said n-type DBR;

(d) forming an MQW active layer over said n-GaN based layer, wherein said MQW active layer comprises a material so that said MQW active layer emits a light with a wavelength of 380-600 nm upon an applied electric power;

(e) forming a p-type distributed Brag reflector (DBR) over said MQW

active layer; and

(f) forming a p-GaN based layer over said p-type DBR and etching away a portion of said p-GaN based layer, said p-type DBR, said MQW active layer and said n-GaN based layer whereby said n-GaN based layer has an exposing region and disposing said n-type electrode over said exposing region of said n-GaN based layer and disposing said p-type electrode over said p-GaN based layer.

14. The method as in Claim 13, wherein a step of (f') is added in said step (f) after the forming and prior to the disposition of said n-type and said p-type electrodes, said step (f') is forming a transparent contact layer (TCL) with a suitable thickness and being transparent to a light with a wavelength of 380-600 nm over said etched p-GaN layer, wherein said TCL having an exposing side.

15. The light-emitting structure as in Claim 13, wherein said metal reflector has a reflectance of greater than 90% and said p-type DBR has a reflectance of 50-80%.

16. A light-emitting structure for a light emitting diode (LED), comprising a substrate, a resonant cavity structure, a contact layer, an n-type metal electrode and a p-type metal electrode, wherein:

said substrate comprising sapphire and having a buffer layer thereon;

said resonant cavity structure formed over said buffer layer, comprising an n-type distributed Bragg reflector (DBR), an n-GaN based layer, a multi-quantum well (MQW) active layer and a p-type DBR layers;

said contact layer being a p-GaN based layer and formed over said

p-type DBR;

said n-type metal electrode disposed over an exposing region of said n-GaN layer; and

said p-type metal electrode disposed over said p-GaN based layer;

wherein said MQW active layer comprises a material so that said MQW active layer generates a light with a wavelength of 380 nm to 600 nm in response to an applied electric power between said p-type electrode and said n-type electrode.

17. The light-emitting structure as in Claim 16, wherein said substrate further comprises silicon carbide (SiC), silicon (Si) and gallium nitride (GaN).

18. The light-emitting structure as in Claim 16, wherein said contact layer further comprises a p-InGaN and a p-AlInGaN epitaxial layers.

19. The light-emitting structure as in Claim 16, wherein said n- and p-DBR have a reflectivity of less than 90%.

20. The light-emitting structure as in Claim 16, wherein said light-emitting structure further comprises a TCL formed over said contact layer and conductive and transparent to a light having a wavelength of 380 to 600 nm.

21. A light-emitting structure for a light-emitting device (LED) comprised of an epitaxial structure, comprising:

an LT-GaN / HT-GaN buffer layer having a first formed LT-GaN buffer layer on a substrate and a then formed HT-GaN buffer layer on said LT-GaN buffer layer, wherein said LT-GaN buffer layer has a thickness of 30 to 500 Å while said HT-GaN buffer layer has a thickness of 0.5 to 6 μ

m;

an n-AlGaN / GaN distributed Bragg reflector (DBR);

an n-GaN semiconductor layer having a thickness of 2 to 6 μ m;

an InGaN / GaN MQW active layer;

a p-AlGaN / GaN DBR; and

a p^+-GaN based semiconductor layer having a thickness of 0.2 to 0.5 μ m;

wherein said substrate comprises sapphire and said MQW active layer emits a light with a wavelength comprising 380-600 nm in response to an applied electric power.

22. The light-emitting structure as in Claim 21, wherein said substrate further comprises silicon carbide (SiC), silicon (Si) and gallium nitride (GaN).

23. The light-emitting structure as in Claim 21, wherein said p^+-GaN based semiconductor layer further comprises p-InGaN and p-AlInGaN layers.

24. The light-emitting structure as in Claim 21, wherein a transparent contact layer (TCL) is further formed over said p^+-GaN based semiconductor layer, wherein said transparent contact layer (TCL) comprising Ni/Au and other conductive material transmissible to a light with a wavelength of 380-600 nm, wherein said TCL has a thickness so that said light may penetrate therethrough.